1206 maps the received parity bits into corresponding data and CRC bits. This mapping result is applied to the CRC decoder **1205** and, if the CRC checks correctly, the data bits are passed to a higher layer at **1207**.

[0069] If the CRC of the mapping result does not check correctly, then the controller **1206** signals a Viterbi decoder **1203** to load the parity bits and data (plus CRC) bits from the buffer **1204** and perform Viterbi decoding. The resulting data plus CRC) bits output at **1208** from the Viterbi decoder **1203** are input to the CRC decoder **1205**. If the CRC of the Viterbi-decoded data bits checks correctly, then the controller **1206** directs the Viterbi decoder to pass the Viterbi-decoded data bits to a higher layer at **1209**. On the other hand, if the CRC of the Viterbi-decoded data bits does not check correctly, then the controller **1206** outputs another negative acknowledgment, to which the other end will respond by retransmitting the original data (plus CRC) bits (see **129** in **FIG. 12**), which are received and written over the previously-received data (plus CRC) bits in buffer **1204**. If the CRC for these newly-received data bits does not check, then the controller **1206** signals for Viterbi decoding of the newly-received data (plus CRC) bits and the previously-received parity bits (which are still in buffer **1204**). If this Viterbi decoding does not result in a correct CRC for the data bits, then controller **1206** can output another NAK, in response to which the parity bits can be re-transmitted, input to controller **1206**, and written over the previous parity bits in buffer **1204**.

[0070] **FIG. 12B** diagrammatically illustrates pertinent portions of an exemplary embodiment of a transceiver which can implement transmitter operations illustrated in **FIG. 12**. In **FIG. 12B** an encoder **1210** (e.g. a convolutional encoder) encodes the uncoded data, and stores the data (plus CRC) bits and corresponding parity bits in buffer **1213**. Apointer **1217** driven by a counter **1211** points to a selected entry **1215** in buffer **1213**. The data (plus CRC) bits and the parity bits of the selected entry **1215** are applied to a selector **1214** that is controlled by a flip-flop **1212**. The data plus CRC) bits of entry **1215** are initially selected for the outgoing packet. If a negative acknowledgment (NAK) is received, the flip-flop **1212** toggles, thereby selecting the parity bits of entry **1215** for the next outgoing packet. For all additional negative acknowledgments that are received, the data (plus CRC) and parity bits of entry **1215** are alternately selected at **1214** by the toggling operation of the flip-flop **1212** in response to the received negative acknowledgements. When a positive acknowledgment (ACK) is received, the flip-flop **1212** is cleared and the counter **1211** is incremented, thereby moving the pointer to select another data entry of buffer **1213** for connection to the selector **1214**. Of course, the counter **1211** can also be incremented in response to a pre-determined time-out condition.

[0071] Exemplary simulation results shown in **FIG. 13** compare the throughput of Bluetooth **(131)** against mode 2 **(132, 133)**. The simulation assumes single path independent Rayleigh fading for each hopping frequency. This is a good model for mode **2**, for the exponential decaying channel model as specified in the aforementioned criteria document. The x-axis is the average E_b/N_0 of the channel over all the hopping frequencies. For **16** QAM **(132)** mode 2 achieves 2.6x throughput of Bluetooth and for 64 QAM **(133)** mode 2 achieves 3.9x throughput of Bluetooth. Depending on the EbNo or other available channel quality information, the modulation scheme that offers the highest throughput can be chosen.

[0072] **FIGS. 14, 14C** and **14D** illustrate exemplary system parameters for mode 3. The symbol rate in these parameter examples is 11 Msymbols/sec (which is the same as in IEEE 802.11(b)), and the spreading parameter is 11 Mchips/sec for these examples. **FIG. 14A** shows further parameter examples with a spreading parameter of 18 Mchips/sec and a symbol rate of 18 Msymbols/sec. The transmit spectrum mask for mode 3 can be, for example, the same as in IEEE 802.11(b), as shown in **FIG. 15**. At a symbol rate of 11 Msymbols/sec this spectrum mask allows a reasonable cost filter. This spectrum mask can be achieved, for example, by a raised cosine filter of α=0.22. In one example, the master and slave can start communicating in mode 1. If both devices agree to switch to mode 3, the probe, listen and select (PLS) protocol for frequency band selection is activated. In some exemplary embodiments, this protocol allows selection (for mode 3 transmission) of the best contiguous 22 MHz band in the entire 79 MHz range. This gives frequency diversity gains. **FIG. 16** shows exemplary simulation results of the packet error rate (PER) for the IEEE 802.15.3 exponential channel model as specified in the aforementioned criteria document for a delay spread of 25 ns. The simulation results (using uncoded QPSK) compare performance using PLS according to the invention **(161)** to performance without PLS **(162)**. The delay spread of 25 ns gives a frequency diversity of 3 to the PLS technique over the 79 MHz ISM band. This results in a performance gain for PLS of about 15 dB.

[0073] Exemplary communications between transceivers employing modes 1 and 3 can include the following: begin transmission in mode 1 and use PLS to identify good 22 MHz contiguous bands; negotiate to enter mode 3; after spending time T_2 in mode 3 come back to mode 1 for time T_1; the master can communicate with any Bluetooth devices during time T_1 in mode 1; also during time T_1 and while in mode 1, PLS can be used again to identify good 22 MHz bands; the devices again negotiate to enter mode 3, this time possibly on a different 22 MHz band (or the same band).

[0074] An example with T_1=25 ms and T_2=225 ms is shown in the state transition diagram of **FIG. 17**. These choices allow transmission of 6 video frames of 18 Mbps HDTV MPEG2 video every 250 ms.

[0075] A master can communicate with several devices in mode 1 while communicating with other devices in mode 3, as shown in the exemplary WPAN of **FIG. 18**.

[0076] An exemplary timing diagram illustrating transmission in modes 1 and 3 is shown in **FIG. 19**. The Master and Slave communicate in Mode 3 for T_2=225 msec. while the remaining 25 ms are used for communicating with other Slaves (e.g. for 17.5 ms) and for PLS (e.g. for 7.5 ms) to determine the best 22 MHz transmission for the next transmission in mode 3. The time used for PLS is also referred to herein as T_{PLS}.

[0077] **FIG. 19A** diagrammatically illustrates an exemplary embodiment of a wireless communication transceiver according to the invention. The transceiver of **FIG. 19A** supports mode 1 and mode 3 operation. A mode controller **195** produces a control signal **196** which controls transitions